

DELAWARE CONSTRUCTION SPECIFICATION

WIRE MESH GABIONS CS 54

1. SCOPE

The work shall consist of furnishing, assembling, and installing rock filled, wire mesh gabions and geotextile material or bedding as shown on the drawings.

2. MATERIALS

Gabion baskets shall be a minimum of 11 gauge (0.118 in – 3.00 mm) galvanized steel wire, fabricated into hexagonal triple-twist mesh openings no larger than 3 ¼" x 4 ½". Selvage wire running through all edges shall be a minimum of 9 gauge (0.148 in – 3.76 mm) galvanized steel wire.

Lacing, tie and connecting wire shall be a minimum of 13 ½ gauge (0.087 in – 2.21 mm) galvanized steel wire.

All wire shall conform to ASTM Specification A-510, grade number 1006 through 1020. Wire shall have a minimum tensile strength of 60,000 lb/in² (413(413MPa) and a class 3 coating conforming to ASTM A-641. The galvanized coating will be applied by the hot dip process in accordance with ASTM A-385 and ASTM A-386.

Tolerance limits for height, length, and width shall be subject to plus or minus 5 percent of the manufacturer's stated sizes. Wire diameters shall be within a tolerance of 0.004 inches per ASTM A-641.

Rock shall conform to the quality requirements in Delaware Material Specification 213. Rock size and gradation shall be limited to those shown in the table below for gabion baskets 12 inches or greater in depth. Rock size and gradation limits for gabion baskets less than 12 inches in depth shall be as shown on the drawings.

<u>Gabion Rock Size (in.)</u>	<u>Predominant Rock Size (in)</u>	<u>Minimum Rock Dimension (in)</u>	<u>Maximum Dimension (in)</u>
12 Deep Basket	4 to 8	3	10
18 and 36 Deep Baskets	4 to 8	3	12

Bedding of aggregate, geotextiles or other materials shall conform to the requirements shown on the drawings.

3. **FOUNDATION PREPARATION**

The foundation on which the gabions are to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill is required, it shall consist of approved materials and shall conform to the specified requirements. Vegetation, surface irregularities, and loose material shall be removed from foundations. Gabions, geotextile material and bedding shall not be placed until the foundation preparation is completed, and the subgrade surfaces have been inspected and approved by the technician.

4. **GABIONS**

Assembly of gabions shall consist of shaping and tying each individual basket. Where the length of the gabion exceeds its horizontal width, the gabion shall be equally divided by diaphragms into cells whose length does not exceed the basket horizontal width. Diaphragms shall be fabricated of the same mesh and gauge as the body of the gabions. The gabion shall be furnished with the necessary diaphragms secured in proper position on the base in such a manner that no additional tying at this juncture will be necessary. Each gabion basket shall be assembled by tying all untied edges, including diaphragms, with lacing wire in accordance with one of the following two methods:

Lacing shall be used for both the assembly of baskets and connecting baskets together unless otherwise specified in Section 7. The lacing procedure consists of cutting a length of lacing wire approximately 1 ½ times the distance to be laced (not to exceed 5 feet), securing one end of the wire at the corner by looping and twisting alternately lacing with single and double loops at other approximately four (4) inch intervals, and securing the other end of the wire to selvages by looping and twisting.

Looping, when specified in Section 7, will be permitted as an alternative to lacing only for the assembly of each individual basket unit. The loop

procedure consists of cutting an adequate length of lacing wire for a triple loop and securely twisting the ends of wire a minimum of five (5) twists after looping. The maximum spacing between loop ties shall be ten (10) inches with a minimum of (3) ties per edge.

Placing of gabions shall consist of installing baskets to the lines and grades shown on the drawings. Gabions shall be securely tied to each adjoining gabion with lacing wire along the vertical reinforced edges and the top selvages. Empty gabion sections stacked on a filled line of gabions shall be tightly laced to the latter along the front and back.

When the upper section only partially overlaps the lower section, the lacing shall be done along the line where the front edge of the upper section meets the lower section, and where the back edge of the lower section meets the base of the upper section. For the end sections only, the layer of empty gabions placed on top of filled gabions must be wired to the latter at the front, back and external lateral edge.

Prior to placement of rock, the baskets used in retaining walls shall be stretched. If necessary, the gabions shall be temporarily staked to maintain proper alignment. Staking through geotextile material will not be allowed. Connecting wires shall be attached during the filling operation to preserve the strength and shape of the structure.

5. **FILLING OPERATION**

The gabions shall be carefully filled with rock, by either hand or machine placement to ensure alignment, avoid bulges, and provide a compact mass with a minimum of voids. Machine placement may have to be supplemented with hand work to ensure a neat, compact, square appearance.

Cells in rows shall be filled in stages such that the depth of rock placed in any cell does not exceed the depth in an adjoining cell by more than one foot. Rock smaller than 4 inches showing on visible faces shall be rodged into or removed from the gabion prior to any earth backfilling.

The placement of rock in gabions, including the installation of connecting wires, shall be performed in the following sequence for the depth of gabions indicated.

a. 36-inch Deep Gabions.

- (1) Fill gabions to a depth of 12 inches.

- (2) Tightly tie one connecting wire in each direction to opposite faces of each gabion cell at a 12-inch height above the base except for exposed cell faces. Two connecting wires evenly spaced shall be used in lieu of one between an exposed front face and the opposite back face.
- (3) Fill gabions another 12 inches and tightly tie connecting wires to opposite faces of each gabion at this level as described in step 2 above.
- (4) Complete filling of gabions to the top.

b. 18-inch and 12-inch Deep Gabions

- (1) Connecting wires are not necessary in the 12-inch size.
- (2) When connecting wires are required, tightly tie connecting wires to the opposite face, at 9 inches above the base as described of the 36-inch deep gabions, after filling with rock to this level.

All connecting wires shall be looped around two mesh openings and ends of the wires shall be securely twisted with a minimum of five (5) twists after looping.

When the gabion has been filled, the lid shall be bent and stretched until it meets the perimeter edges of the front and end panels. To assist in closing and lacing, a pinch bar or special closing tool may be used. The lid shall then be tightly laced with lacing wire to the edges of the front and end panels. The lids shall also be securely tied to each adjoining gabion with lacing wire along all contact edges. Lacing adjacent lids to the vertical panels in one operation is acceptable. Lacing the back edge of the lid to adjoining gabions shall be done prior to filling the gabion. The lid shall be tied to each diaphragm by lacing wire. Lacing shall be performed in the same manner as described in Section 4.